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VEGETATION IN DRAINAGE DITCHES CAUSES FLOODING

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VEGETATION IN DRAINAGE DITCHES CAUSES FLOODING

The purpose of a drainage ditch is to remove excess water from the soil and ground surface. Damage to growing crops after a rain is often averted by the rapid removal of this surplus water. Any obstruction in a ditch retards the velocity of the moving water and thereby reduces its water carrying capacity which commonly results in injurious flooding on the adjoining land.

Vegetation is the most common form of obstruction in ditches. Drainage ditches badly choked up with growth are a very common sight in every section of the country. This growth consists most generally of weeds, tall grasses, vines, bushes, and small trees. The generally bad condition of ditches throughout the country would naturally lead one to conclude that very few landowners realize that there is a great difference in the discharge or water-carrying capacity of a cleared and an uncleared ditch.

The presence of vegetation in a drainage ditch indicates that the landowner is not deriving the full benefit from drainage and protection from flooding for which the ditch was intended. Apparently the truth of the above statement is not generally understood by the farmer, so for the purpose of showing definitely to what extent the capacity of a ditch is affected by the growth of vegetation a number of measurements of the flow of water in ditches before and after clearing and before and after the growth of vegetation are given for ditches in the States of Arkansas, Mississippi, Missouri, and Illinois.

Old Town Creek Ditch near Tupelo, Miss.

A view of this ditch taken during the year 1913 before it was cleared is shown in figure 1. One side slope and part of the bottom were nearly covered with small saplings, brush, and cane. The other side slope was comparatively free from vegetation. A view of this same course of the ditch taken during the year 1914 after the growth had been cleared out is shown in figure 2. By comparing the water carrying capacity before and after clearing it was found that the ditch carried 1-1/2 times as much water after it was cleared. This is a rather appreciable increase when considering that only one side slope was covered with a light growth of vegetation.

Ditch No. 1 of the Little River Drainage District near Chaffee, Mo.

In figures 3 and 4 are shown views of this ditch with and without a growth of willows. The rather thick willow growth shown in figure 4 is a little over one year old. The water carrying capacity of this ditch for cleared condition shown in figure 3 was about twice that for uncleared condition of willow growth shown in figure 4. Severe flooding of considerable depth and duration occurred along this ditch when it was full of willows and very little overflow when it was kept cleared.

Lake Fork Special Ditch near Bement, Ill.

In figures 5 and 6 are two views of this ditch. One of these views was taken looking upstream and the other downstream over the same portion of the ditch. The view in figure 5 was taken during July 1924 when the vegetation in the ditch consisted principally of bushy willows which were in full leaf. The view in figure 6 was taken during May 1926 after the growth had been cut out. Measurements of the flow in this ditch were made before and after clearing and it was found that the ditch carried about 75 percent more water after it was cleared. The cost of clearing out this ditch was insignificant as compared with the losses sustained by the farmers owing to the tardy removal of the excess water after a rain. Since clearing the ditch, satisfactory drainage prevails.

Kaskaskia Mutual Ditch near Bondville, Ill.

In figure 7 is shown a view of this ditch which had never been cleared since it was dug as one might suppose judging from the large size of the trees in the channel. A view of this same ditch taken when the trees were in full leaf is shown in figure 8. You will note that the thick foliage practically obstructs the view of the channel. It was found that the capacity of the ditch in this condition is only about one-third of what it would be if it were cleared out, or in other words it would carry about three times as much water after being cleared. It is hardly necessary to state that ditches of this sort afford extremely poor drainage. Not realizing the cause, landowners will often have such ditches dredged larger at great expense when if the growth were simply removed at a comparatively small expense, adequate drainage would generally be provided.

Cummins Lake Ditch near Gould, Ark.

In figures 9 and 10 are shown two views of the same portion of this ditch taken at different times. The view in figure 9 was taken during March 1925, shortly after construction, when there were only a few dead weeds in the ditch. About one year later during March 1926 a thick growth of willows almost completely filled the ditch outside of the low water channel. The view in figure 10 was taken during June 1926 when the willows were in full leaf. Measurements of the flow in this ditch were made to determine what effect a comparatively short-time growth produces. It was found that the capacity of this ditch before the appearance of the willow growth was twice as large as it was found to be for the condition shown in figure 10 when the willows were in full leaf. These measurements apparently indicate that drainage ditches should be cleared out every year in this part of the country in order to prevent appreciable reduction in water carrying capacity. An examination of the bottom of this ditch showed that a certain amount of silting had taken place which was due no doubt largely to the presence of vegetation. It is a generally established fact that where vegetation remains over a long period of years the cross section of the ditch is greatly reduced in size by the accumulation of silt, and it becomes necessary to redredge it at great expense. This, of course, is especially true where the ditch drains a somewhat rolling and hilly watershed.

Cypress Creek Drainage Ditch No. 18 near McGehee, Ark.

In figure 11 is shown a view of this ditch which had never been cleared since it was dredged. The growth of trees is about eight years old. Measurements of the flow in this ditch were made when there was a heavy growth of foliage on the trees and it was impossible to see any appreciable distance down the channel. It was found that the capacity of this ditch is only about one-fourth of what it would be if it were cleared out, and that a cleared ditch about one-third its size would have the same water-carrying capacity. The capacity in its present condition is entirely too small to provide satisfactory protection against flooding. Overflows generally occur after every heavy rain.

West Branch of the Salt Fork Ditch near Urbana, Ill.

In figure 12 is shown a view of this ditch containing vegetation consisting of a thick growth of small trees of different varieties. It was found by measurements that the water-carrying capacity of this ditch as shown in the view could be practically doubled by simply clearing it out. The capacity when the trees are in full leaf is considerably less than for the condition shown as will be seen from the results of measurements made on some of the other ditches.

The results of the measurements described in the foregoing tend to show:

(1) That the usefulness of a ditch is greatly impaired by the growth of vegetation.

(2) That the clearing of a long-neglected ditch will often provide satisfactory drainage and prevent injurious overflows.

(3) That costly mistakes of redredging ditches larger are sometimes made when simply clearing the ditch would have produced the desired result.

(4) That in most localities drainage ditches should be cleared out once a year if maintained in a state of high efficiency.

(5) That the expense of clearing out a channel is in most cases much less than the crop losses suffered from one moderate overflow.

(6) That vegetation in a ditch causes appreciable silting which often requires the redredging of the ditch at great expense as compared with the much smaller expense of systematic maintenance.

Figure 1.—Old Town Creek Dredged Ditch near Tupelo, Miss., before clearing, 1913.

Figure 2.—Old Town Creek Dredged Ditch near Tupelo, Miss., after clearing, 1914. The cleared channel carried 1-1/2 times as much water as the same uncleared channel shown in figure 1.

Figure 3.—Ditch No. 1 of Little River Drainage District near Chaffee, Mo., before growth of willows, April 1933. This cleared ditch carried twice as much water as the same uncleared ditch shown in figure 4, and the adjoining bottom lands were less subject to damaging floods when kept cleared.

Figure 4.—Ditch No. 1 of Little River Drainage District near Chaffee, Mo., after growth of willows December 1925.

Figure 5.—Lake Fork Special Ditch near Bement, Ill., before clearing, July 1924. This channel carried 1-3/4 times as much water after it was cleared out as shown in figure 6, resulting in satisfactory drainage and flood control on adjoining lands.

Figure 6.—Lake Fork Special Ditch near Bement, Ill., after clearing, May 1926.

Figure 7.—Kaskaskia Mutual Ditch near Bondville, Ill., April 1926.

Figure 8.—Kaskaskia Mutual Ditch near Bondville, Ill., July 1924. This channel would carry three times as much water if it were cleared out, and thereby afford adequate drainage and protection against floods.

Figure 9.—Cummins Lake Ditch near Gould, Ark., before growth of willows, March 1925.

Figure 10.—Cummins Lake Ditch near Gould, Ark., after growth of willows without foliage, June 1926. This same channel before growth shown in figure 9 carried twice as much water as for condition shown in this figure. The effectiveness of this ditch in preventing floods decreases rapidly as the vegetation is permitted to grow.

Figure 11.—Ditch No. 18 of Cypress Creek Drainage District near Megehee, Ark., March 1925. This channel would carry four times as much water if it were cleared out, and the duration of damaging floods over the adjacent land would be greatly reduced.

Figure 12.—West Branch of Salt Fork Ditch near Urbana, Ill., April 1925. The water carrying capacity of this channel was doubled by simply clearing out the growth, and adequate protection against flooding of adjoining lands was provided.